

NOTE ON BACTERIAL DISEASES OF THE ROOTS OF
THE *LEGUMINOSÆ*.

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(Communicated by J. H. Maiden, F.L.S.)

(Plate iv.)

Whilst transplanting some sensitive plants (*Mimosa pudica*, Linn.), my attention was attracted to the peculiar tuber-like bodies on their roots, which were distinct from the tubercles caused by worms (*Tylenchus*).

When broken across these bodies were noticed to possess a juice having a remarkable smell; microscopic examination showed this fluid to be teeming with bacteria, all in a state of violent agitation. Cover-glasses were smeared with it, passed through the flame and stained in methyl-blue; examined both in the wet state and after clarifying and mounting in balsam, the bacteria were seen to be bacilli. Search was made for a similar disease in other plants, but only specimens of the *Leguminosæ* were found affected, indeed every plant examined of that order had a bacterial disease. The tubercles on the roots exhibited great variety of shape, as did also the bacilli contained in them; some of the latter were very thin and long, others thick, some curved, many were motile, some inmotile, whilst others exhibited Brownian movements; all apparently were referable to the genus *Bacillus*.

No Leguminous plant appears to be altogether free from a bacterial disease of the roots; some genera, however, are affected more than others. I have so far not noticed a similar disease on

any other plant. A number of experiments were made to ascertain if plants could be grown free from these diseases, and with care it was found possible to do so.

I also artificially cultivated, on a broth made of beans and thickened to a jelly with agar-agar, some of these bacteria. I afterwards found that "Tubercular root-diseases of the Leguminosæ" was a subject upon which much attention had been bestowed in Europe, especially in Germany. Professor Marshall Ward of London has studied these diseases carefully for many years past, and has contributed much to the Transactions of the Royal Society upon the subject; he found that the more a plant was affected with the disease the better it grew; the bacteria help the plant to assimilate nitrogen and are a benefit to it.

Although this subject has been so ably worked up in Europe, I hope these notes will not be unacceptable to the Society, as no record, as far as I am aware, of root-diseases of bacterial origin has been made in Australia.

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EXPLANATION OF PLATE.

The roots of five leguminous plants affected with bacteria. Commencing in order from the top, the plants are *Mimosa*, *Sesbania*, *Desmodium*, *Medicago*, and *Crotalaria*.

(Reproduced from a life-size photograph.)